

RECENT RESULTS ON SEMI-LINEAR HYPERBOLIC PROBLEMS IN BOUNDED DOMAINS

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1. GENERALITIES

Let Ω be a bounded open domain in $\mathbb{R}^n$, $n \geq 1$ and f, g two odd functions: $\mathbb{R} \rightarrow \mathbb{R}$ such that,

$$(1.1) \quad f \in C^1(\mathbb{R}), \quad f' \geq 0$$

$$(1.2) \quad g \text{ is continuous and non-decreasing.}$$

The partial differential equation

$$(1.3) \quad \begin{cases} \frac{\partial^2 u}{\partial t^2} - \Delta u + f(u) + g\left(\frac{\partial u}{\partial t}\right) = h(t, x), & (t, x) \in \mathbb{R}^+ \times \Omega \\ u(t, x) = 0 & (t, x) \in \mathbb{R}^+ \times \partial\Omega \end{cases}$$

represents the small oscillations of an n -dimensional membrane with fixed edge $\{0\} \times \partial\Omega$ under the action of 4 forces

- The elastic (global, distributed) force represented by Δu .
- A non linear restoring force $-f(u)$, of local character.
- A damping force $-g\left(\frac{\partial u}{\partial t}\right)$, possibly non linear, also of local character.
- An exterior time-dependent force density $h(t, x)$.

The physical interpretation of (1.3) suggests that the initial value problem must be well set in the function space $C(\mathbb{R}^+, H_0^1(\Omega)) \cap C^1(\mathbb{R}^+, L^2(\Omega))$ and that the total energy given by

$$(1.4) \quad E(t) = \int_{\Omega} \left\{ \frac{1}{2} \left(\frac{\partial u}{\partial t} \right)^2 + \frac{1}{2} |\Delta u|^2 + \int_0^{u(t, x)} f(s) ds \right\} dx$$

must play an important role in the definition of solutions to (1.3).

Equation (1.3) has been studied by a number of authors since 1953. More precisely, the initial-value problem has been studied successively

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Semilinear Hyperbolic Problems In Bounded Domains

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Semilinear Hyperbolic Problems In Bounded Domains:

Semilinear Hyperbolic Problems In Bounded Domains: Bestsellers in 2023 The year 2023 has witnessed a noteworthy surge in literary brilliance, with numerous compelling novels captivating the hearts of readers worldwide. Lets delve into the realm of top-selling books, exploring the engaging narratives that have charmed audiences this year. The Must-Read : Colleen Hoover's "It Ends with Us" This poignant tale of love, loss, and resilience has gripped readers with its raw and emotional exploration of domestic abuse. Hoover skillfully weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can prevail. Uncover the Best : Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This spellbinding historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids compelling storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Semilinear Hyperbolic Problems In Bounded Domains : Delia Owens "Where the Crawdads Sing" This mesmerizing coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens weaves a tale of resilience, survival, and the transformative power of nature, entrancing readers with its evocative prose and mesmerizing setting. These popular novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of compelling stories waiting to be discovered. The novel begins with Richard Papan, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is an exceptional and thrilling novel that will keep you speculating until the very end. The novel is a cautionary tale about the dangers of obsession and the power of evil.

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